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# EDITORIAL NOTES

## RATIONING

IT is, of course, to be hoped that domestic fuel rationing will be avoided by voluntary saving, in the Government campaign in which the Gas Industry is joining vigorously. To what extent the present appeal is bridging the formidable gap between coal production and consumption we do not know, though we think it is commonly understood that the gap remains a serious and unsettled problem, and that unless the gap is shortened the Industry will be unable to fulfil its obligations. Naturally we have had, and continue to have, much correspondence on the matter, and a major point which stands out from the letters we have received is that in many cases, should rationing be enforced according to the Beveridge scale set out in the Government's White Paper on Coal, the cuts will be "vicious." A further point is that those who have turned to gas from former use of raw coal will be penalized the most, the while the use of gas in lieu of coal must mean great saving in transport costs and difficulties as well as actual conservation of coal. From the aspect of coal conservation and national economy, we have worked out that 1 cwt. of coal should have as its equivalent 8 therms of gas (in making 4 therms of gas, 1 cwt. of coal also makes ¼ cwt. of coke, which in thermal effect is rather more useful than ½ cwt. of coal). Why, then, the figure of 1 cwt. of coal = 5 therms of gas, as propounded in the Government White Paper? Perhaps the question was not considered sufficiently by the Gas Industry in the first instance. Either that, or the Industry has staked its utilization efficiency too high while placing the efficiency in use of raw coal too low. Disregarding for the moment the aspect of coal conservation—which, in truth, ought never to be ignored for an instant—if we give gas an efficiency in use of 50% for domestic fuel purposes, and coal an efficiency of 20%, then, for 1 cwt. of coal usefully employed, we should need 6 therms of gas. Time and rationing—whether voluntary or compulsory—will show if the assumption regarding these efficiencies is sound or is wrongly based.

The foregoing thoughts may have some bearing on a letter on the subject of the incidence of possible or probable fuel rationing—it is from Mr. J. E. White, of Newcastle—which we are glad to publish in our columns to-day. In common with many of our correspondents, Mr. White is concerned about the drastic cuts in gas consumption which consumers may have to suffer if compulsory rationing is imposed, and the cases he puts forward will no doubt be studied and analyzed. They bring out prominently the fact that what may be termed the Industry's "backbone consumers" will be those hardest hit—those, in brief, who have acquired, through gas, a fairly high standard of comfort, certainly much higher than could have been attained using raw coal. However, we are at war; and we would ask whether even the sacrifices outlined by Mr. White would mean a grave lack of warmth as distinct from a considerably reduced standard of comfort.

Let us examine one of the examples cited in the letter—that of a consumer occupying a 5-roomed house having 3–4 (*i.e.*, 4) occupants who would, it is adduced, suffer a cut in his fuel of something like 40% should rationing on the Beveridge scale be enforced. Actually, we think we ought to call attention to this quotation from the Government's White Paper on Coal: "If any householder satisfies the local fuel overseer that his previous consumption was not unduly high, it will not be cut by more than 33⅓%." To continue, however, we work out that under enforced rationing the coal allowance for such a household in the North of England would be 5 tons, or alternatively 500 therms of gas, per annum. In his Institution Paper, Mr. Crowther gave several examples of fuel consumptions of typical households before and after conversion to "all-gas"—see p. 458 of the "JOURNAL" of June 17 last. Among these was a house having five principal rooms. Before conversion to "all-gas," this household, in peacetime circumstances, consumed 3 tons of coal and 285 therms of gas. The rationing scale, if it came into force, would mean that such a household's consumption would be reduced from 585 therms (coal, 300 therms, gas 285 therms) to 500 therms. The cut would be about 14%. In fact, this household changed over to "all gas," and the registered annual consumption was 686 therms. With compulsory rationing to 500 therms per annum, the cut would be 27% or thereabouts, which is heavy; and while Mr. Crowther stated in his Paper that "the standard of comfort enjoyed by the occupants of these houses [*i.e.*, the all-gas houses] is appreciably above the average level of the country as a whole," it is not a particularly consoling thought that the very people who, by using gas and thereby conserving coal and transport, should feel the cuts most severely.

Let us return to the example we have chosen from those given by Mr. White. If the cut in the particular consumer's fuel is estimated at rather over 40% under compulsory rationing, then his present requirements for what is not a large house amount to 9 tons of coal or its equivalent. In gas, the equivalent is 900 therms. In his Paper Mr. Crowther stated: "Detailed records have been kept of over 200 typical examples of these houses, and it has been ascertained that their annual consumption of "useful" therms averages 316 per annum." At a utilization efficiency of 50%, this means a consumption of 632 therms per annum (compare with the 686 therms quoted above). Of all the examples given by Mr. Crowther, in two only did the consumption of all-gas houses exceed 1,000 therms. We can assume, then, that 900 therms a year for a five-roomed house is a comparatively high peacetime consumption. Under total-war conconditions, a drop to a consumption of, say, 632 therms (giving, if not a high standard, at least reasonable peacetime satisfaction) could hardly be regarded as inflicting intolerable suffering; and under the clause quoted from the Government's White Paper on Coal, the drop from 900 therms under compulsory rationing would still leave a consumption of 600 therms. Will the crux of the matter be found to rest in whether in practice 600 therms of gas gives as comfortable a performance as 6 tons of coal?

## A "BLENDED POLICY"

THE suggestion made by one of the contributors to the discussion on the June Institution Papers—that the Gas Research Board should investigate a process for the treatment of coal under pressure to produce oils and gas—was a trifle belated considering that investigation on these lines has been a major item of the research programme of the Industry for several years past and remains a chief item. The position to-day is that, after continuous work in the laboratory, a "small exploratory unit"—not a small scale plant—is being erected at a gas-works in the South of England, but the stage has not been reached at which any reliable estimate can be made of the cost of gas produced by complete gasification under pressure. Years of intensive investigation are required before the picture can take tangible shape. Work on the high-pressure hydrogenation of coal has not as yet revolutionized the gas-making process as we know it to-day.

We are all looking to fuel co-ordination in the future, and to our mind the question of outstanding importance is that coal,

before being used in one form or another—gas, electricity, or smokeless solid fuel—for domestic purposes should be processed. In this co-ordination we think the Gas Industry's share of the immense field will be very great indeed; national economy and standards of living should demand this. It follows that the Industry's policy in regard to gas and coke in the immediate future should be clear to itself. At the Institution meeting Mr. Crowther put forward an excellent case for the all-gas house—a proved practical proposition in his area of supply. His Paper was followed by that of Dr. Hartley, who, in what seemed to some pessimistic vein, put forward the view that after the war there will be an increased demand for coal and coke ranges. We discussed the import of this Paper in the "JOURNAL" of July 8. The main points we made were these: The cost of gas can be kept low by a judicious combination of gas and coke; if solid fuel were to be adopted to any large extent for cooking in place of gas, gas load factor would be seriously affected; it is not a fact that the price of gas service must be as low as that for coal. "There must," we added, "be a balancing of factors. . . . The Industry should be in a position to determine this balance and to give guidance to individual gas undertakings regarding gas and coke usage." It should not be impossible for the Gas Industry to indicate with some assurance where gas and coke have special advantages and how the supply position favours one or the other where both are suitable—the aim being the extended use of gas at a low price. With gas-making as we know it to-day, extended sales of gas depend on judicious and successful marketing of coke, and to our mind there is no call to contemplate with apprehension the ousting of gas by solid fuel in any form.

We think that the best way to tackle the near future problems—which are now the subject of such earnest discussion in Industry circles throughout the country—is on the lines of what we may term a "blended policy" based on gas and coke. As example of the discussion of these problems by the "Juniors" we had the four Papers (to the Manchester Juniors) which we abstracted in the "JOURNAL" last week (pp. 130–141), in one of which it was remarked that we may discover that carbonization is a crude and relatively inefficient method of coal treatment, but that at the moment we must consider our smokeless fuel service to include coke. Regarding the "discovery" aspect, we have mentioned high-pressure gasification, and it was natural that reference should be made to this process when the Papers were presented. Now very real advantages would be derived from operation of gas-making under pressures of several atmospheres, and most of them would be associated with the reduced size of plant. For example, in 1938 we had particulars of a producer gasifying 20 tons of lignite per day and making about 600,000 cu.ft. of 440 B.Th.U. gas. The outlet pipe to the purifying plant was just over 2 in.; after the coolers, the internal diameter of the "works main" was 1½ in.; the 5-mile main leading to the town where the gas was consumed was 4 in. in internal diameter, because, with a main of this size, six hours' storage capacity was obtained; and, of course, purification of the gas from sulphur, and the recovery of benzole, are simplified. A speaker at the meeting of the Manchester Juniors remarked on a plant said to be capable of producing a million cu.ft. of gas a day, which, together with its purification plant, could be "stood comfortably" on the small platform of the Gas Company's demonstration theatre where the meeting was held. Small wonder that such possibilities hold fascination; but as far as this country at any rate is concerned they are possibilities and not by any means present realities.

The same speaker explained that in an all-gas 5-roomed house he consumed 222,000 cu.ft. of gas per annum during the past two years, which included, of course, two very severe winters. Now 220,000 cu.ft. a year would mean in a comparatively small town of 10,000 houses a gas-works capable of producing *for domestic consumption alone* something in the region of 2,000 million cu.ft. per annum, as against a works at present sending out probably 100 million cu.ft. per annum. In other words, a gas-works twenty times the present size. A gas-works of such dimensions would produce about 65,000 tons of coke for sale—6½ tons per domestic consumer in the 10,000 houses envisaged. But these consumers are "all-gas." The coke must be sold elsewhere. It could not be sold in the area of any other gas undertaking with an all-out "all-gas" policy. If it met with a bad market or no market at all, how could the all-gas undertaking with its 10,000 houses sell gas at anything like a competitive figure? Which brings us once again to the main purport of this note—the determination of a "blended policy."

## Harvesting and Grain Drying

We have been much interested in reading a new publication, *Combine Harvesting and Grain Drying*, issued by the London and Counties Coke Association. At first sight it may be surprising that an organization concerned with the marketing of coke should issue publications on what are obviously specialized agricultural subjects; but in many of the new developments fuel—largely coke—is entering a new, a vast, and an important field. Also the L.C.C.A. is qualified to treat these subjects in an expert way. It may be recalled that towards the end of last year the Association appointed an Agricultural Adviser on its technical staff—a practical instance of long-term policy and far-sighted view. The material which the present publication contains—including informative sections on grain-drying equipment, fuel, and furnaces—is of vital importance to the farmer at the present time, and the Association is fortunate in having an official who can discuss agricultural problems with the farmer in his own language.

# Obituary

Mr. ARTHUR CUTHBERT, Engineer and Manager of the Stirling Gas Light Company, died suddenly on July 22. A native of Montrose, Mr. Cuthbert was trained as an engineer with Messrs. Clark and Beckitt, Maryhill Engine Works, and studied at the Royal Technical College, Glasgow. Subsequently he was on the staff of the Glasgow Corporation Gas Department, his service there being interrupted by the Great War, in which he fought as a member of the Glasgow Chamber of Commerce Battalion (the 17th H.L.I.). In 1920 Mr. Cuthbert became Assistant Gas Manager at Dumfries, and seven years later he was appointed Engineer and Manager to the Burgh of Grangemouth Gas Commissioners. Six years ago he took over his post at Stirling. Deceased was a member of The Institution of Gas Engineers, and served on the Council of the North British Association of Gas Managers. Fifty-two years of age, he is survived by his wife and by a young son and daughter. His brother, Mr. Carson Cuthbert, is Gas Engineer and Manager at Kelso.

# Letter to the Editor

### Rationing

DEAR SIR,—In your Editorial Notes of July 15, under the heading "Voluntary or Compulsory"? there appeared the following sentence: "Circumstances differ so widely that general rules cannot be laid down to cover all cases; but the problem is the same everywhere—to cut coal consumption by one-eighth or more." This figure of one-eighth, or 12½%, while in your article it is directed towards coal consumption in gas-works, none the less appears to have become the generally accepted target at which economy drives are being aimed, but I fear that it is by no means a true representation of the position, since there is a very substantial gap between the figure of 12½%, and the actual position called for under the Beveridge report. An economy of 12½% might reasonably be achieved by ultra careful usage of all fuels, but to achieve the requirements of the Beveridge report is a very different matter indeed. Below is given a series of examples of a variety of people in widely different walks of life, and who are using the usual combination of solid fuel, gas, and electricity:

| Occupation. | House. | No. of rooms. | No. of persons. | Cut in fuel to be effected. |
|---|---|---|---|---|
| (*a*) Storekeeper | Council | 4 | 3 | 39% |
| (*b*) Draughtsman | S/Villa | 5 | 5 | 35% |
| (*c*) Widow | " | 5 | 2 | 39% |
| (*d*) Handyman | Flat | 3 | 3 | 34% |
| (*e*) Dpt. Chief | Bungalow | 7 | 4 | 30% |
| (*f*) Salesman | Terraced | 6 | 2 | 37% |
| (*g*) Fitter | Council | 4 | 3 | 21% |
| (*h*) Spinster | Terraced | 9 | 4 | 19% |
| (*i*) Labourer | " | 5 | 2 | 29% |
| (*j*) Clerk | S/Villa | 5 | 3/4 | 43% |

It seems to me, therefore, that either the figure of 12½% is wrong or there has been a very substantial error in the calculations which led up to the recommendations of the Beveridge report, and I suggest that the "JOURNAL" would be doing a considerable service if it could correlate these two figures. From the details given above it will be seen that to meet the requirements of the Beveridge scheme the average fuel user will have to go without fuel or lighting for two days out of

every seven, and consequently suffer a degree of sacrifice which does not appear to have been generally realized.

I feel that in respect of the economy campaign sponsored by the Government, and supported by E.D.A. and the B.C.G.A., there is need to place great emphasis upon the need for economy in fuel generally, rather than the whole of the drive being directed towards gas and electricity, or one or the other of these two refined forms of coal utilization. If the drive is directed towards one or the other of these two services, it is quite possible that a completely unbalanced condition in the fuel industries may arise which will certainly not be in the national interest.

Yours faithfully,
JOSEPH E. WHITE.

30, Grainger Street,
Newcastle-upon-Tyne, 1.
July 20, 1942.

## Directorate of Gas Supply

A Ministry of Fuel and Power announcement states that the Director-General has appointed to the Directorate of Gas Supply Mr. C. A. Masterman, whose primary duties will be to co-ordinate the work of the Directorate in connexion with the use of gas for war purposes.

## National Gas Council

A Meeting of the Central Executive Board of the Council was held on July 14, the Chair being taken by Sir David Milne-Watson, Bart., LL.D., D.L.

Before proceeding with the business of the meeting, the Chairman reported the illness of Mr. W. J. Sandeman, and it was unanimously decided that a letter should be sent to him, wishing him a speedy recovery.

*Coal.*—It was reported that the functions of the Board of Trade with regard to coal, gas, oil, and electricity had now been formally transferred to the Ministry of Fuel and Power; a report was received with regard to coal supplies.

A short report of what transpired at the meeting of the Coal Committee of the Conjoint Conference of Public Utility Associations held on June 9 was circulated, with regard to (*a*) the Government White Paper on "Coal"; (*b*) the functions of the Public Utilities Coal Committee; (*c*) the National Coal Board; (*d*) coal-producing regions and functions of the "Director" who is to be appointed in each coal-producing region to deal with public utilities; (*e*) machinery for determining coal prices.

A brief report which had been circulated on the subject of excess transport costs on coal—Government subsidy—showed that the whole question was still under review by the Ministry of Fuel.

It was reported that a meeting had been held between the Ministry of War Transport and representatives of the Railway Companies on June 17, and that the matter of railway wagon demurrage would come before the Conjoint Conference next week.

The recent increase of 3s. per ton in the price of coal was discussed, and a copy of the Midland (Amalgamated) District Scheme relating to Price Levels was circulated.

It was agreed that the position of the Gas Industry with regard to the price of coal and the effect on the finances of gas undertakings raised very serious issues, and a deputation was appointed to approach the Government on the matter.

*Fuel Rationing and Fuel Economy.*—Mr. E. V. Evans, Vice-Chairman of the National Gas and Electricity Committee, reported on the further deliberations of the Committee. It was unanimously agreed that the Council should support to the utmost the Government's Fuel Economy Campaign, and it was particularly stressed that the propaganda ought to emphasize the necessity not only for economy, but for actual self-denial.

The following Orders were considered:

(i) The Coal Supply Order, 1942, dated May 15, 1942;
(ii) The Fuel and Lighting Registration and Distribution Order, 1942, dated June 12, 1942;
(iii) The Fuel and Lighting Registration and Distribution (Legal Proceedings) Order, 1942, dated June 12, 1942;
(iv) The Waste of Fuel Order, 1942, dated June 26, 1942.

It was reported that the matter of the use of gas for transport was still in the hands of the appropriate Government Department, who would shortly made a pronouncement on the subject. In the interval the Council agreed to obtain certain information relative thereto.

An arrangement was reported between Imperial Chemical Industries Ltd., and the Gas Light & Coke Company, whereby a free licence will be granted to the National Gas Council to permit its members to operate a patent for the removal of hydrogen sulphide from gas by the use of peat. A resolution expressing the thanks and appreciation of the Board to the Gas Light & Coke Company for their action in the matter was duly passed.

A letter from the Society of British Gas Industries dated June 8 was read, regarding the allocation in future by the Board of Trade of terneplate containing about 25% to 30% tin for the manufacture of gas meters, instead of tinplate. The matter is being studied from a technical point of view by the Meters Committee of The Institution of Gas Engineers.

It was agreed that the next meeting of the Board should be held on Tuesday, Aug. 11.

## Institution of Gas Engineers

The Council of The Institution of Gas Engineers met in London on July 14, and the following were some of the matters dealt with:

*Obituary.*—The deaths of four members of the Institution were reported, including Mr. John Wilson (Dundee), a former member of Council.

*Committees, 1942–43.*—The membership of Committees of the Institution for 1942–43 and members to represent the Institution on kindred organizations for the year were reviewed and agreed.

*Gas-Works Safety Rules Committee.*—A report was made of the activities of the Gas-Works Safety Rules Committee. The Committee has under consideration at the moment a number of matters of special interest, including, *inter alia*, protection of plant against frost, co-operation with the National Fire Service, and operation of water gas plant under emergency conditions. A memorandum on the latter is in course of preparation for circulation to all gas undertakings. In the meantime information thereon can be obtained on application to the Secretary of the Institution.

*Gas Education Executive Committee.*—A report was made of the work of the Gas Education Executive Committee. A recommendation of the Committee and of the Board of Examiners that a Home Paper be an alternative to the Thesis in the Diploma Examinations was approved. The Home Paper will be introduced in the 1943 Examinations for the Diploma. Further information regarding the Home Paper can be obtained from the Secretary of the Institution.

*Committees of Enquiry.*—Three of the four Committees of Enquiry have now submitted their Reports to the Council and the Report of the fourth Committee is nearly completed. The Council has resolved to publish these Reports at an early date.

*Autumn Research Meeting.*—It was decided not to hold an Autumn Research Meeting this year. Short reports of the work of the Technical Committees of the Institution will be published in due course in the 3rd Annual Report of the Chairmen's Technical Committee.

*Gas Research Board.*—A report was made by the Acting Director of Research on the progress of the current investigations of the Gas Research Board.

*Affiliated District Gas Associations.*—Reports were made by District Members of the Council concerning activities in their Districts.

*Ministry of Works and Planning.*—A report was made of the progress of the work of the Gas Installations Committee of the Institution which is collaborating with the Directorate of Post-War Building of the Ministry of Works and Planning. The Committee has been asked by the Directorate to submit its Interim Report before the end of October, 1942.

*British Council.*—In response to a request from the British Council, it was agreed to recommend to members of the Institution that, subject to suitable safeguards, facilities be granted for small parties of officers and men of Dominion, Indian, Colonial, and Allied Forces stationed in the United Kingdom to visit gas undertakings.

*Leeds University.*—A report was made of the new study courses at Leeds University for students wishing to enter the Gas Industry. These include a 4-year course and degree in Chemical Engineering.

## Producer Gas Transport

A scheme for equipping at least 10,000 commercial and other motor vehicles on essential work with producer gas plants within nine months was described in detail at a meeting of road operators, service station representatives, and other sections of the transport industry under the auspices of the Mobile Producer Gas Association at Caxton Hall, Westminster, on July 16.

The Association comprises the independent manufacturers of producer gas plants, and claims that its scheme does not run counter to any plans the Ministry of War Transport may have for the mass production of gas plants, but rather that it supplements such plans and offers the advantage that conversions can start at once.

The scheme proposes that the existing manufacturers should at once expand production to their present full capacity of 200 plants per week, that they should be enabled by the allocation of sufficient metal to increase their collective output by the end of 12 weeks to 400 plants per week, that the maximum possible degree of standardization should be aimed at, and that the distribution, installation, and servicing of producer plants should be handled by the motor trade. The Association has a list of 150 motor trade depots (some of which are already retailing fuel) possessing staff already fully trained in producer gas practice. It suggests that the service stations should also be distributors of fuel in the same way as they are now retailers of petrol.

Other features of the scheme, which has been submitted in the form of a memorandum to the Director of Producer Gas Vehicles, Ministry of War Transport, are that the Association is in a position to provide for the training of 400 men and women per week as drivers; that a proficiency bonus should be paid to drivers of producer gas goods vehicles; that vehicle owners ordered to convert their vehicles to producer gas should be compensated by reduced taxation in respect of each vehicle so as to cover the capital outlay, and that for income tax purposes the expenditure should be treated as current expense, and also that hire purchase terms should be made available.

Details have been worked out for standardization in manufacture to enable the carrying of standardized stocks of spare parts, and for practical tests to ensure that each type of members' equipment on the market reaches a satisfactory level of performance, filtration, and reliability.

While it appears that the Government scheme is based on the use of anthracite only as a fuel, the Association's scheme contemplates the use of a wide range of fuels, including activated high temperature coke, low temperature coke, and charcoal. The Association contends that there are fundamental objections to the imposition upon the road transport industry of a Government sponsored design to the virtual exclusion of the types developed by the existing makers. A single design plan would, it is claimed, stifle the energetic research and development work now being carried on by the independent makers, the importance of which lies in "improving the breed" of existing plants and extending the range of the fuels that can be used.

## Association of Tar Distillers

The Association has been intensively concerned, more particularly during the past two months, with the increasingly difficult labour situation. In this connexion a memorandum has been prepared, based on the experience of a number of tar distillers, on the employment of women in the tar distillation industry. The memorandum has already been approved by the various Government Departments and the Unions concerned, and will be circulated throughout the industry shortly.

Another aspect of the general shortage of labour and facilities which has been causing grave concern within the industry is that of transport. This problem has been given most careful consideration on a regional basis, and close co-operation is being ensured in the use of rail tanks and other forms of transport of tar products. A survey with special reference to the most economic use of the rail tank transport available to the industry has just been completed.

Rapid progress is being made by the Association, in co-operation with the B.S.I., in the preparation of war emergency specifications for a wide range of tar products replacing imported bitumen. War emergency specifications for tar paints and for a range of pitches for mastics are nearing completion.

Addressing a recent meeting at Manchester of tar distillers in the Association's North-West Regional Area, the President, Mr. C. E. Carey, emphasized the manner in which the industry lends itself to the development of strong regional organizations, particularly for the consideration of the present and future problems connected with the planning and development of the industry on a national basis—to which end such regional co-operation is an almost essential preliminary step.

# INSTITUTION DISCUSSION

## WRITTEN CONTRIBUTIONS ON COMMUNICATION No. 248

### POLICY AND SCOPE OF THE GAS RESEARCH BOARD

**By E. V. EVANS**

Emeritus Professor **J. W. Cobb** (Leeds) wrote: This Paper points the way to be travelled by the Gas Industry in co-ordinating its research work and making it effective. Provision has to be made for the work itself, for its interpretation, and finally for its application. This last will depend not on the Gas Research Board but upon the Industry as a whole, on its willingness and capacity to use with discrimination the tools placed in its hands by research, and opportunities in this respect will presumably increase as the work of the Board develops. In the actual research work growth in amount and complexity will be easily assured, but quality is a much more elusive requirement, demanding always the maintenance of a delicate balance between necessary control and that respect for individual initiative which counts for so much. Mere regimentation is useless.

It is interesting to note the character of the work carried out by the Joint Research Committee of the Institution and Leeds University since that pioneering venture in co-operative research was established. Significantly its first piece of work, carried out with Dr. E. W. Smith as Research Chemist, was the quantitative thermal analysis of the performance of a gas fire, a new recognition of the necessity for such analysis. But the attention and appreciation of the Gas Industry as a whole was first fully secured by the excellent work carried out by Mr. J. W. Wood on the relative efficiencies obtainable from different grades of gas in typical appliances. This gave the Industry firm ground to stand upon when the Gas Regulation Act of 1920 was in process of formulation, and when its position had been threatened by the report of the Coal Conservation Committee (1918) with its unrestrained advocacy of the claims of electricity. There came at the same time, however, and to none more clearly than the Authors of the Clerk-Smithells-Cobb report drawn up to present the irrefutable claims of gas (1919), a realization that the Industry was sorely in need of reliable quantitative data on its manufacturing processes, and there followed systematic work to establish thermal and chemical balance-sheets for the processes in use. This was a primary essential, but to carry through such a scheme successfully required many years of first-class though unspectacular effort from Dr. A. Parker and Dr. F. J. Dent in turn (with their assistants), whose unremitting skill and patience have thereby provided the Gas Industry with a firm basis of ascertained fact for its guidance towards higher levels of performance and efficiency and also towards processes of greater promise than any in use. Thus, in the 37th Report (1935), we find it recorded that, while preparing the results of work on the controlled operation of the water-gas process, a start had been made on a laboratory investigation of gasification in oxygen, suggested to the Institution in 1920 as holding out attractive prospects. This start was followed up by the use of higher pressures than normal (and of catalysis), primarily aimed at gasifying the fixed carbon of coal as methane instead of carbon monoxide, and a collaboration with the Fuel Research Board was soon effected to widen the front of attack. It is plain that results already obtained and waiting for transference to a larger scale suggest a new method of gasifying coal, or rather suggest that the gasification may take different new forms to meet a variety of fuels and circumstances, and to give a variety of gaseous liquid or solid products as required.

The experimental work prepares the way not only for the Gas Research Board, but for a new technique in gas engineering which will demand more and more insistently scientific knowledge of the kind now known conveniently as chemical engineering, since it is finding its place not only in the Gas Industry but in all developing branches of chemical technology.

Mr. **E. H. Harman** (Commercial Gas Company) wrote: The development of an all-gas policy for the domestic consumer would provide a full heating service compatible with the requirements of the modern way of living, and would secure the retention of the domestic load by the best of all methods, namely, its extension.

It must be regarded as a major triumph for the Industry that these principal objectives may be obtained without increasing the costs of the present inadequate heating service available to most domestic consumers. To what extent, however, can the policy be pursued before the demands of the all-gas consumer become a source of concern to the Gas Undertaking?

An examination of the curve of weekly gas consumption in a typical all-gas flat given in Appendix D of Mr. E. Crowther's Paper shows a variation from 22.5 to 4.5 therms weekly or a ratio of 5. This ratio may be accepted as a normal figure, individual cases in experimental installations by the Commercial Gas Company having showed variations between 2 and 10. Assuming a ratio of 2 between the maximum and minimum weekly sales as being an average figure for the Industry in normal times, it is clear that the all-gas consumer with an abnormal peak load coinciding with the existing peak load will be purchasing a much higher proportion of peak load gas than the normal consumer. Yet this additional quantity of peak load gas would be supplied at the lowest rates.

In most undertakings the effect on the winter peak will be gradual and may, in some cases, even be masked by the development of the undertaking as a whole. The problem, however, still remains and attention must be given to its solution. It is unlikely that the change to all-gas will be rapid, and the innate conservatism of consumers will permit a long-term view being taken of the problem and its consequent solution by the Gas Research Board, rather than by any modification of the all-gas tariff.

I venture, therefore, to draw attention to the commercial possibilities of a plant which could manufacture liquid fuel or gas at will. Such a plant would help to take care of the winter gas load, and during periods of lower demand could be turned over to the manufacture of liquid fuels.

Imperial Chemical Industries, Ltd., have already demonstrated the commercial production of a high-grade fuel by hydrogenating coal under pressure, and actually purchased large quantities of creosote oil from the Gas Industry for use in the plant. Mr. Evans has indicated that progress with the manufacture of coal gas by hydrogenation of coal under pressure has gone as far as the erection of an "exploratory" unit. Can these two processes be combined in a versatile plant which will produce gas or liquid fuel at will? If so, the supply of peak load gas at low prices may yet be an economic proposition and the Gas Industry may pursue an all-gas policy without fear of the future.

## SCIENTIFIC CONTROL IN THE RETORT HOUSE

### By T. C. FINLAYSON

Mr. F. **Greenhalgh** (Oldham) wrote: In the pressure of our various duties we are all, I think, less acutely and continuously aware of the value of the materials used in our operations than we might be, and in no part of the works does this apply more forcibly than in the retort house.

During the reconstruction of one of our works some ten years ago, we provided equipment for the weighing of all coal into retort bunkers, and for the supply and weighing of any grade of coke to the producers. Such equipment could be installed with advantage in any medium-sized retort house. Steam flow to retorts and producers is metered, and pressures before the controlling orifice disks are recorded.

The data we obtained from tests form the basis of an assessment of all carbonizing results, and is recorded on a three-page weekly report which is subjected to careful examination by the works manager and the chief chemist, and made available to all technical assistants for comment and any necessary alterations in plant adjustment. These weekly reports are a valuable aid to effective control of the plant.

Mr. **R. D. Keillor** (Greenock) wrote: Any well-informed administrator with time to study the national value of technical supervision must arrive at the same conclusion as the Author—namely, that any money expended on salaries to good technical supervisors is in the nature of a gilt-edged investment. If it is the case, as Mr. Finlayson suggests, that adequate technical supervision is not always made available, then, by deduction, one can arrive at the conclusion that the administration of some gas undertakings leaves much to be desired. In order to promote national fuel economy in gas undertakings, the first step would appear to be to examine local administrative machinery with a view to cutting away dead wood and replanting with vigorous scientific direction. Obviously this is not a job for the Institution, but advice might in the first place be given by the Institution to gas undertakings through the National Gas Council as to the vital necessity of adequate technical supervision being made available in gas-works in the interests of national fuel economy.

In view of the apparent need for more technical supervision in some gas-works, it is to be hoped that further calls upon the Industry for the Armed Services will be strictly limited. It would also appear desirable to review the general position with regard to the number of carbonizing technicians available throughout the United Kingdom in relation to the size and number of retort houses (and batteries of coke ovens) in operation. In framing future policy, I believe that information along the lines indicated would be of inestimable value.

Mr. **C. F. W. Rendle** (Redditch) wrote: I have been associated with the formation and functioning in the Midlands of a consultative panel of gas engineers whose members have been impressed by the disparity in the technical staffing as between works of similar size. The panel's work has so far been concerned with the avoidance of breakdown rather than with questions of efficient retort-house practice and so I am unable from evidence to conclude that the absence of technical assistance goes hand in hand with lack of efficiency, although it is reasonable to assume that such is the case. In my opinion the ultimate value of this Paper will be measured by the extent to which it induces gas engineers to become introspective.

Those features of the Paper which give rise to this opinion because they may possibly be dismissed by a casual observer as platitudes are:

(i) The advisability of regularly checking the accuracy of instruments, notably disappearing filament pyrometers.

(ii) The maintenance of regular rates of coal feed to continuous vertical retorts and the frequent checking of the accuracy of individual extractor speeds.

(iii) The regular compilation of accurate gas-making results.

(iv) The efficient recovery of surplus heat from flue gases.

(v) The constant observance of the effect upon fuel economy of vagaries in works operations.

## GAS-FIRED INDUSTRIAL EQUIPMENT

### By E. A. C. CHAMBERLAIN

Dr. **C. M. Walter** (Birmingham) wrote: The Author refers to "operating efficiency" as distinct from "thermal efficiency." At times such as the present, when every endeavour is being made to reduce gas consumption to a minimum in order to conserve supplies for essential work, the "operating efficiency," as distinct from the "thermal efficiency" of the furnace or appliance, is obviously the only criterion which matters, as we are only concerned with the production of a maximum output with a minimum fuel consumption.

It will be appreciated that the thermal efficiency of an industrial appliance will not only depend upon the useful load which is heated, but also on the construction of the apparatus or appliance, and more particularly in regard to the thermal capacity of the material from which it is constructed. It would also be agreed that the heat losses from the appliance would to a certain extent depend upon the time cycle during which the appliance is in use, or in other words, the period during which heat is being absorbed by the material of the appliance itself quite apart from useful heat supply to load. The operating efficiency, as the Author points out, can thus be interpreted simply in terms of cu.ft. of gas per lb. of work treated.

The necessity for designing furnaces and heating appliances so that the highest possible efficiency of fuel application is realized is indicated by a simple example of the salt bath furnace, where every precaution must be taken to reduce the heat losses to a minimum, by a suitable design of the brickwork setting and the provision of suitable lagging material so as to consolidate loss from the radiating surfaces, as it will be appreciated that in some instances with improper design its total loss of heat might have been greater than that required by the load itself.

Dr. Chamberlain refers to the importance of a periodical check on the conditions of combustion by the simple method of obtaining an analysis of the products, and, from the percentage of carbon monoxide, carbon dioxide and oxygen present, ascertaining the combustion efficiency. It does not always appear to be fully appreciated that a simple test of this kind might result in considerable improvements in efficiency being found possible.

Reference is made to the length of flue pipe being properly arranged for in order to obtain the requisite flue pull after due allowance has been made for any back-pressure produced by baffler or control dampers. It should be mentioned that once this has been determined for a given waste gas temperature, the "pull" controlling the secondary aeration can be controlled by some form of automatic damper interconnected with the gas supply, several designs of this form of automatic control now being available.

On the question of thermostatic control, reference is made to the importance of placing the temperature detector in such a position as to detect as nearly as possible the true temperature. We have on many occasions, as Dr. Chamberlain mentions, experienced considerable difficulty when positioning of the temperature detector has been incorrect, and stress should be laid on the importance of paying attention to this matter.

Reference is also made to the importance of obtaining fuel consumption records. From our experience it seems essential that if any serious attempt at economy is to be made, provision for a continuous chart correlating fuel consumption and output should be made.

Under the heading "Special War-time Problems," Dr. Chamberlain makes reference to the use of gas at subnormal pressures of the order of 5/10 in. Our experience in this connexion has been that provided suitable adjustments have been made to the injectors, furnaces operating on the atmospheric principle have been found to be capable of producing the same output at the subnormal working pressure, provided that the thermal input was adjusted to be equivalent to that obtained when the appliance was operating at the higher pressure.

With regard to the use of producer gas, it would be interesting if Dr. Chamberlain could give information regarding what he considers a suitable hydrogen content in the case of producer gas for operating with open-type flame burners. From our experience it would appear that where producers are used in the case of emergency, the hydrogen content of the gas should be as high as possible, and some form of automatic control of blast saturation temperature should be resorted to.

## THE GAS INDUSTRY IN RELATION TO POST-WAR DOMESTIC ARCHITECTURE

### By E. CROWTHER

Mr. **F. C. Briggs** (Dudley) wrote: I feel that the scheme outlined in this Paper, while perhaps a practical immediate solution, should be considered an interim arrangement for one or two reasons.

(i) I believe the kitchenette is doomed even in the smaller type of house. I believe that the housewife, in a house of this class, desires a kitchen that is big enough to work in easily and to use satisfactorily as a dining room for some meals.

(ii) The arrangement portrayed does not seem to make the best use of the heat losses from the hot-water boiler and tank. It would seem better that such heat losses should not go into the kitchen—they would be objectionable in the summer and not sufficient in a larger kitchen in the winter—but should be utilized for keeping the bathroom warm. The drying cupboard in the kitchen has the same disadvantages in the summer time.

(iii) I do not believe that the general public has yet been educated to accept universally an all-gas house. I believe one solid fuel fire will be demanded. Moreover, the complete all-gas house raises the problem of the disposal of consumable kitchen refuse. Before the completely all-gas house is acceptable, I believe a radical change in the design of the gas fire, which cannot at the moment be foreseen, would be necessary. Alternatively, if the absence of smoke is to be achieved, then something quite different from the present coke grate and coke, or a means of consuming coal smokelessly, will have to be found.

Under one illustration it is mentioned that the washing machine is drawn out. I suggest that this is not an entirely satisfactory arrangement. The wash boiler in a kitchen-living room without a flue is undesirable, and the really satisfactory flexible tubing has yet to be invented.

There are two main matters, however, which I would like to raise. First, has the Author investigated and formed any opinion upon the communal distribution of hot water or steam? Where colonies of houses are to be erected it does seem that this is a line of progress that might very well be considered, allowing a liberal supply of heat on tap for washing purposes which will utilize a lower grade and therefore cheaper fuel than gas.

The second point, and it is the one that I feel should lead us to consider the houses outlined as mainly interim arrangements, is in connexion with the use of electricity. I do not think the demand for electricity in all houses can be ignored, and I think the authorities concerned with building houses will decide that the two services of gas and electricity should go into houses, although in point of fact practically all the work can be done by gas, and the one service would be cheaper. It must be admitted, however, that a small supply of electric power can go a long way to eliminating labour. I agree that this Paper was not the place nor perhaps the Institution Meeting the time to discuss this. Unilateral disarmament may be as senseless in industry as it has proved politically, but if a sane national fuel policy is to be adopted then it is necessary some time for the Gas and Electricity Industries to agree upon a division of the energy requirements in private houses, which in the long run, and on the assumption that both are required, will give the most satisfactory financial results; satisfactory from the point of view of the return upon the capital expended, which in the end must be the most satisfactory from the point of view of the consumer's pocket.

Lt.-Col. **J. Kennington** (Grimsby) wrote: There may be cases where a gas-ignited solid fuel fire (preferably coke) in the living room, with a back boiler installation for hot water, will be demanded in working-class homes, with possibly a gas water heater installed for summer use.

Instantaneous gas water heaters make a greater appeal to the public than heaters of the storage type, and they provide a field of service in which we experience very little competition.

It is very desirable that all housing development should come under the control of a qualified architect, and that gas appliances installed should be standardized as far as possible, and approved by the Gas Industry. Closer business contacts with builders and builders' merchants will be of the utmost importance.

It is essential that post-war housing schemes should be controlled on general lines by the Ministry of Health, or some other Government Department. We must insist that flues in bedrooms are absolutely necessary. It is evident that the medical profession are appreciatng to a much greater extent the radiant efficiency of the modern gas fire attached to a flue of the correct proportions. In cases of serious respiratory complaints, they insist that a gas fire be installed. They strongly condemn the practice of building houses having bedrooms without flues, and consider these a retrograde step in house design from a health point of view. In my own town many doctors are convinced that in cases of pneumonia the case is always far more difficult to fight when the patient is in a flueless bedroom. In such circumstances it is only possible to admit fresh air into the room by opening a window or door, thus creating harmful draughts.

Ventilation should also be adopted as standard building practice in regard to kitchens, as condensation on the tiled walls is a source of annoyance to the occupier, especially when gas apparatus is installed. There will be many cases where ridge-tile terminals may not be effective for this purpose, and the building of a flue with a proper terminal should be recommended.

I agree that it is very desirable that the Government Department responsible for housing should see that fair and equitable treatment is meted out to public utility undertakings with regard to the cost of installing their respective services, so that there shall be no repetition of housing estates being developed, and the Gas Industry not allowed to have access thereto.

Mr. **L. Friedman** (London) wrote: The Author suggests in the Appendix that the additional cost of the very full gas equipment provided is £38 19s. 6d., which is 13% of the cost of the house, the rent of which is 10s. 4d. per week gross. If, as is assumed in the Paper, the rental for gas appliances is also to be 13% of the rent, namely, 11d. per week, how is the balance to be found? It seems an excellent idea that some form of subsidy should be granted for the equipping of the home as well as for the bare shell, and I would very much like to see this theme developed in detail. Perhaps Mr. Crowther can give some guidance in the matter.

It has also to be remembered that, on the basis of pre-war finance, the purchase price of appliances represented considerably less than half of the total cost, which had to include fixing, maintenance, interest, overheads, commission, &c. These total costs have to be recovered by the gas undertaking. Even assuming that some of these costs are reduced by careful planning and mass installation, it would still seem that the equipment for the non-parlour type house will involve a debit to the undertaking of some £96 over a period of ten years, to recover which it would be necessary to charge approximately 3s. 8d. per week. It may be suggested that this amount may be reduced by considering the profit on the gas sold, and this involves some consideration of the running cost.

Some time prior to the publication of the Paper I was informed of this very interesting project, and made some rough calculations which led me to believe that the annual gas consumption could not be appreciably less than 400 therms. At 8d. per therm this would be equivalent approximately to 5s. per week or, at the special rate available in Newcastle of 4d. per therm plus 10s. per quarter standing charge, the weekly cost would be approximately 3s. 3½d. in addition to the hire charge.

When allowance has been made for the cost to the consumer of lighting, radio, &c., and fuel and kindling for the one solid fuel fire provided for in the scheme, it would seem that a figure not greatly exceeding 3s. 6d. per week should be aimed at for the total gas bill, and that this should allow for at least 60 gall. of hot water per day raised through approximately 65° F. (142 therms of hot water per annum). If the use of the appliances is to be within the consumer's household budget it does not seem practicable to make very much profit on the gas.

With regard to water heating it is agreed that for the very exceptional conditions applying to the immediate area surrounding Newcastle, it may be possible to provide hot water by means of a gas-fired storage system within the consumer's household budget. But there is no doubt whatever that the service could be provided at at least 20% less cost to the consumer by using an instantaneous sink gas water heater and an instantaneous bath water heater suitably designed and installed. Is it therefore economic to install a system which occupies approximately 24 cu.ft. of valuable space instead of one requiring less than 4 cu.ft. on the wall? Surely working-class families should be able to have as much hot water as they can afford just when it is wanted without waiting and without being limited? Storage of 30 gallons restricts the average family of two adults and two children to a rigorous rationing system with a time-table, and necessitates some means of lighting the circulator some hours before the family rise in the morning if the necessity is to be avoided of having to burn gas all night to have the water hot in the morning. A quantity of 30 gall. with relatively slow recovery does not seem to suit the average family where children have to be washed and the children's clothes, not to mention all the normal washing up and clothes washing, bathing, food preparation, and cooking, which it is so desirable to increase rather than to limit.

It would appear from perusal of the plans and elevations attached to Mr. Crowther's Paper that a 6-ft. bath is being used which requires at least 50 gall. of water if the body is to be reasonably immersed. It is possible that some error may have been made in scaling off the dimensions of the bath, but according to the plans it cannot possibly be less than 5 ft. 6 in., requiring some 40 gall. of hot water.

Miss **M. Godby** (Gas Light and Coke Company) wrote: Mr. Crowther's planned kitchens are a great improvement on the originals, but he plans a kitchenette on the lines of the accepted standard size of 10 ft. by 8 ft., and most women find this too small for the room in which they spend such a large proportion of their lives; in fact, in houses with two sitting-rooms many women are prepared to sacrifice part or all of the second sitting-room to obtain a larger kitchen.

It is good to find adequate larder space, but this seems to be the only food cupboard, and if things are to be kept in their appointed places every cooking process necessitates a walk to the larder, which is also across the kitchen from the back door, where the food arrives.

Why is the washing machine not under a hinged draining board and next the sink, thus moving the sink along to the position of the present draining board, giving two draining boards and avoiding pulling the washing machine into the centre of the room whenever it is required?

In a small kitchen, would it not be possible to combine the cylinder cupboard and drying cupboard, or let the cylinder heat a linen cupboard in the bathroom?

At present the woman has to stand in her own light to cook, and owing to the small recess for the cooker would see very badly and be very cramped. It is good to observe that Mr. Crowther appreciates the necessity of providing a hot closet even in a modest home, as the industrial worker's household spends a good deal on fuel for keeping food hot for workers who arrive home at odd times.

The flap table is the only working surface and as such is inadequate, apart from the fact that the woman is intended to fit herself into a small space behind this.

(*To be continued*)

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**The Ministry of Works and Planning** announces that owners of foundries, bakeries, coke ovens, blast furnaces, &c., are not required to apply for a building licence under Regulation 56A (S.R. & O. 1941, 1596) for the erection, repair, relining, and maintenance of blast furnaces, coke ovens, brick and lime kilns, bakers' ovens, and other "process structures."

**The Directors** of the Boston Gas Light and Coke Company recommended that the following dividends should be paid: On the ordinary shares £5 2s.%, making £10 4s.% for the year; on the new ordinary shares £4 4s.%, making £8 8s.% for the year. The Directors also recommended that £412 10s. should be credited to the reserve fund. At the annual meeting the Chairman, Alderman T. Kitwood, paid high tribute to the way in which Councillor W. C. Chapman, the Engineer and Manager, and his staff had carried on in a most difficult year.

## Coloured Road Binders

Among the new patents is one (No. 544,826 ; application date, Dec. 4, 1940) granted to the Midland Tar Distillers, Limited, D. W. Parkes, and R. B. Evans. The patent is based on the observation that improved weathering properties can be obtained by using materials other than refined tar, most of which are tar products and all of which are indirectly obtained by distilling coal.

The materials in question are residues obtained by the distillation of polymerized oils obtained by distilling coal; the oil used may be a mixture of oils, and in such a case its heaviest constituent must not be heavier than middle oil—*i.e.*, creosote oil. According to the invention a material consisting essentially of such a residue is applied as a coating. The residues are light-coloured and so can be coloured by being mixed with a pigment. The products thus obtained are, it is claimed, suitable for use in camouflage work.

The residues used may be obtained from various materials. "Crude naphtha" distils up to about 200°C. "Crude benzole" is recovered in many gas-works. These two materials are normally treated for the recovery of products, being sometimes mixed before being so treated. One method of treatment produces a residue known as "naphtha still bottoms" or "benzole still bottoms." Residues suitable for use in the invention may be obtained by distilling these polymers.

A further residue having comparable properties is that obtained by first polymerizing cresylic creosote or carbolic oil and then distilling it. Another residue that can be used is obtained by first polymerizing, for example with concentrated sulphuric acid, "middle oil." "Anthracene oil" or "green oil" does not provide a suitable residue on further distillation.

The residues as described, state the patentees, remain unaffected by atmospheric weathering for surprisingly long periods. Furthermore, not only are their colours quite light compared with that of the usual refined tar, but the colours are stable. The residues may be used in the method according to the invention without further treatment, or may be mixed with light or heavy coal tar oils to produce quick-drying products for hot or cold application.

The residues may be liquid or solid at normal temperatures. In general, if the residue is liquid, its viscosity should not be lower than 30 seconds (B.R.T.A.) at 30°C.; if it is solid, its melting-point should not be higher than 120°C. (Ring & Ball).

As an example, a residue having a specific gravity of 1.084 at 15°C. and a viscosity on the B.R.T.A. instrument of 42 seconds at 30°C. was produced by distilling, in a current of steam, naphtha still bottoms having a specific gravity of 0.944 at 15°C. This residue may be applied straightaway to a road surface or road material, or it may first be mixed with a pigment. For example, a brilliant green product, having a very stable colour indeed, can be made from the residue by the addition to it of twice its weight of green pigment.

To illustrate the improved weathering properties of a road made with the residue produced from naphtha still bottoms as described, the properties of this residue were compared with those of an ordinary surface-dressing tar having a specific gravity of 1.135 at 15.5° C. and a viscosity of 53 seconds at 30°C., with the following results.

The test used was a modified form of the Rubber Strip Test described in *Chemistry and Industry*, June 17, 1939, vol. lviii, No. 24, pp. 565–572. The modification consisted in taking two portions of the tar to be tested and blowing nitrogen through one and oxygen through the other under standard conditions—prior to the spreading of the test films and performances of the test as described in the paper. Two series of critical temperatures C.T.N. and C.T.O. are thus obtained and the differences between these series afford an index of liability of the tar to oxidation (L.O.).

| Hours weathering at 40°C. | Ordinary Refined Tar. C.T.N. | C.T.O. | L.O. | Improved Tar Product. C.T.N. | C.T.O. | L.O. |
|---|---|---|---|---|---|---|
| 4 | 23 | 36 | 13 | 10 | 13 | 3 |
| 16 | 33 | 45½ | 12½ | 19 | 20 | 1 |
| 24 | 36½ | 48½ | 12 | 22 | 23 | 1 |
| 48 | 43 | 53½ | 10½ | 27 | 27 | ... |
| 72 | 45 | 55 | 10 | 31 | 31 | ... |

The critical temperatures have been plotted against the weathering period, and it has been shown that the residue is much more stable to weathering than is the usual refined tar, and that its liability to oxidation is low compared with that of the usual refined tar. Even after a period of 72 hours' weathering the ordinary tar is still liable to considerable oxidation, as shown by the index figure of 10, whereas the index figure for the residue is as low as 3 after only 4 hours' weathering and is zero at 48 hours. It is probable that in the case of the residue the difference between the C.T.N. and the C.T.O. figures is accounted for mainly by simple evaporation.

The rate of drying of the residue in question is approximately the same as that of refined tar, and in certain cases a quicker-drying product is desirable. For example, a quick-drying product is required for the manufacture of pre-coated tarred chips, such as are described in Patent Application No. 11208/40 (Serial No. 541,575). Quick drying is also very important when the road or the road material is to be coloured, because it reduces the possibility of dust and other extraneous matter sticking to the residue and thus killing the colour.

To make such a quicker-drying product, the distillation of the still bottoms is carried further so as to remove more oil from them and to produce a residue having a consistency similar to that of coal tar pitch. The residue is then oiled back with a volatile solvent. Any solvent or mixture of solvents having a suitable boiling range may be used provided that it is not highly coloured or liable to discoloration on weathering. Among solvents which can be used are heavy refined coal tar naphtha, chlorinated hydrocarbons, such as tetrachlorethane, chloroform, carbon disulphide, turpentine, ethyl acetate, white spirit, and other petroleum fractions.

A thin, coloured material which can be applied cold has been made as follows: Naphtha still bottoms were distilled with steam to produce a residue having a Ring & Ball melting-point of 52°C. 26 parts by weight of this residue were dissolved in 24 parts by weight of refined heavy coal tar naphtha, and 50 parts by weight of a brown pigment were incorporated into it in a cone mill. The resultant material was sufficiently thin to be applied through a pressure sprayer without heating. When it was applied to a tarmacadam road surface, it was found to be surface-dry in 30 minutes and had a semi-matt finish. A similar finish was obtained when it was applied to a road surface which had been surface-dressed and chipped. When it was applied to a concrete surface it was found that it penetrated somewhat and gave a matt finish of somewhat lighter shade.

This residue, having a viscosity of 31 seconds at 70°C., has also been found to be a suitable material for making coloured pre-coated chips.

Such chips can be applied to road surfaces of all kinds by first covering the road surface with a thin tack coat of ordinary surface dressing tar, spreading the chips on to the tar while still hot, and rolling lightly.

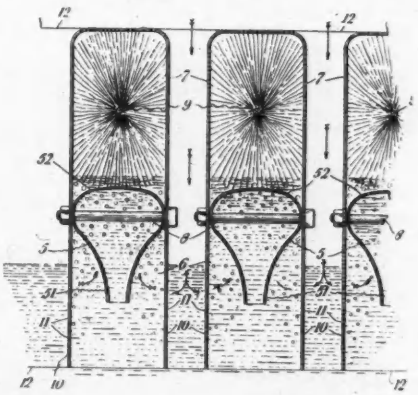
In the examples given residues used were produced in each case from naphtha still bottoms. Much the same results can be obtained by similarly treating benzole still bottoms.

A satisfactory residue has been obtained from cresylic creosote or carbolic oil; and "middle oil," or creosote oil, will also yield a useful residue.

## Gas Washing Apparatus

A patent (No. 545,172; application date, May 27, 1941) relating to gas washing apparatus of the Livesey type has been taken out by R. and J. Dempster, Ltd., and J. W. Scott. According to the invention an apparatus of the kind is provided with means for effecting a preliminary stripping operation upon the gas prior to its encountering the Livesey tubes. Such means may consist of perforated skirt-like screens arranged to dip into the washing liquid at each side of the tubes and throughout the length thereof. By these means the stripping operation is performed in two stages—*i.e.*, the heavier coarser particles carried by the gas are first removed by the passage of the latter through the skirt-like members, whereafter a final stripping is effected by the Livesey tubes, and where such are provided, the bristle brushes or the like enclosed above the tubes in the collecting chambers.

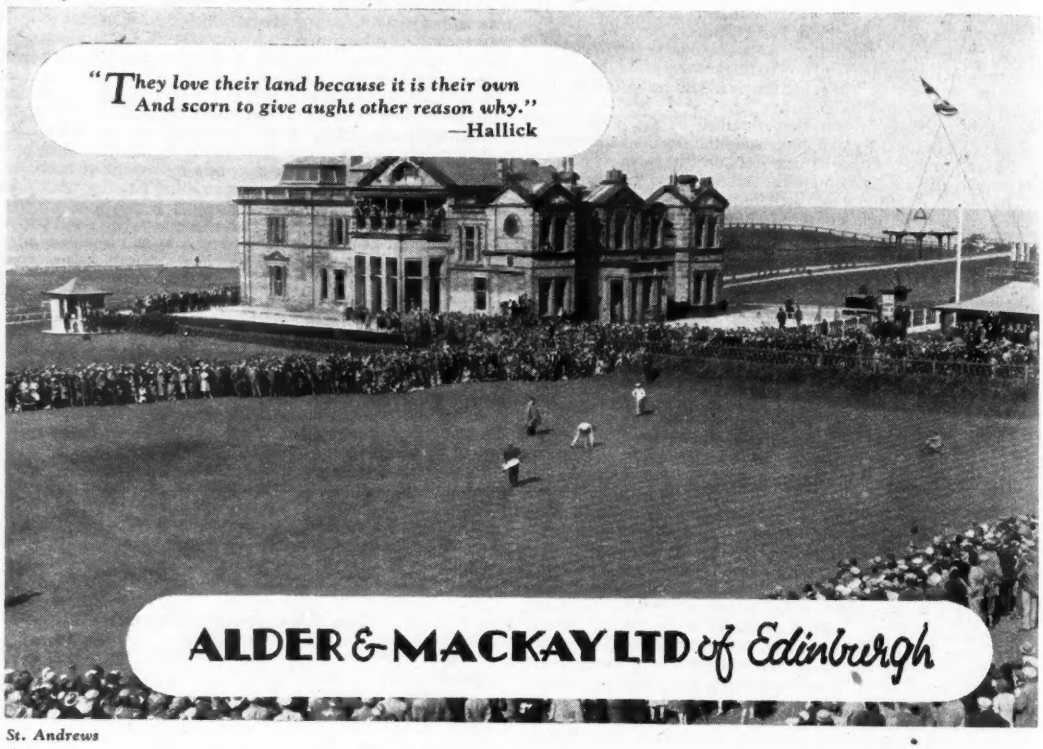
The accompanying drawing shows a battery of washer units, each



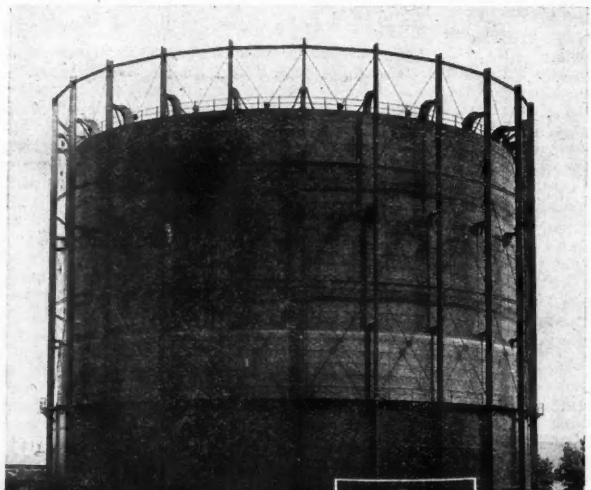

of which comprises a Livesey tube consisting of a perforated plate 5 of approximately inverted U-section of which the downwardly extending sides 51 dip into the washing liquid 6, the upper portions 52 of the plates being enclosed within hood-shaped chambers 7 which are secured to the plates by bolts 8. The chambers 7 preferably contain mechanical stripping means such as the bristle brushes indicated at 9, 9.

The sides of the plates forming the chambers 7 are in this instance extended downwardly in skirt-fashion at 10, 10, the length of the screens 10 being such as to extend, say, two inches below the lower edges of the sides 51 of the Livesey tubes 5. The screens 10 of the hood-plates 7 are perforated (as shown in 11, 11), the aperture size of such perforations being somewhat greater than that of the tubes 5.

In operation, the gas forced into the washing liquid is required to pass through the screens 10 before it encounters the tubes 5, so that heavier or coarser particles of the entrained impurities are removed


"They love their land because it is their own
And scorn to give aught other reason why."
—Hallick
ALDER & MACKAY LTD of Edinburgh

St. Andrews



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before the gas undergoes the finer stripping action of the tubes 5 and brushes 9. Such particles as are arrested by the screens 10 are deposited by gravity at the bottom of the tank, whence they may be removed periodically ; thus the plates 5 are maintained free from clogging or obstruction and a more effective stripping action is achieved. The use of larger apertures in the screens 10 than those in the plates 5 prevents undue additional pressure resultant upon the provision of the screens 10. If desired, the ends of the battery of washer units may be enclosed by transverse plates, the upper and lower edges of which are indicated at 12.

Although the skirt-like screens 10 are shown as being constituted by integral downward extensions of the sides of the chambers 7, they may consist of separate flat pieces of sheet material secured in position by the bolts 8. In either case the members 10 are conveniently made of a material which will resist corrosion by the gas under treatment and the washing liquid in use.

## Heat Distribution in Ovens

Radiation Ltd., H. Hartley, and F. Lake have been granted a patent (No. 545,340; application date, March 13, 1941) concerned with heat distribution from gas oven burners. The object is to enable lateral distribution of the hot gases in the oven to be obtained in a more satisfactory manner than heretofore. The invention comprises the combination with one or each of the longitudinal sides of the opening or nozzle through which the stream of hot gases passes from the burner to the oven, of means for producing a condition of asymmetry at the opposite sides of the stream whereby the stream is deviated laterally away from the adjacent oven wall without impeding the stream.

In one form of oven to which the invention is applicable a long straight burner *a* is arranged (as shown in the sectional perspective view, fig. 1) parallel with and near to one of the walls *b* of the oven, and the burner outlets *c* are disposed in a straight row along the upper side of the burner so that the flames and hot gases rise in a substantially vertical direction. The burner is arranged beneath an elongated

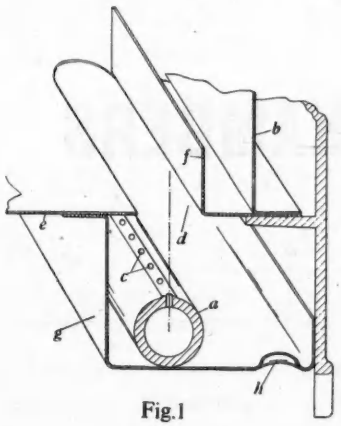


Fig.1

opening *d* in a flat plate *e* forming the bottom of the oven, the breadth of the opening being about equal to or rather greater than the thickness of the ascending stream of hot gases when the burner is in full action. The opening *d* is arranged parallel with, but at a short distance from, the side wall *b*, the side of the opening adjacent to that wall being, for example, about one inch away from the wall. According to the form illustrated by this figure, arranged coincidently with and along the whole or greater part of the length of the side of the opening *d* adjacent to the neighbouring oven wall *b* is an upwardly extending part *f* which presents a vertical or substantially vertical face to the stream of gases emerging through the opening when the burner is in action. The effect of the contact of this face with, or its close proximity to, the stream is to cause the stream to be deviated laterally away from the adjacent oven wall *b* and so cause the stream to spread in the desired manner beneath the various shelves (not shown) in the oven without materially retarding the stream. The member *f* may consist of a separate strip of metal or other suitable material secured in position in any convenient manner, or it may be formed integrally with the aperture bottom plate *e*. The height to which the strip extends above the opening *d* depends on the amount of deviation required in the stream and the most suitable height can readily be ascertained by experiment. It is found that most purposes can be met by strips ranging in height from about one half an inch to about two and a half inches. In this example the burner *a* is contained in a chamber *g* arranged at the underside of the oven bottom, air being admitted to the chamber through one or more orifices as *h*.

*COMPANY MEETING*

## Gas Consolidation, Ltd.

The Annual General Meeting of Gas Consolidation, Ltd., will be held on July 30, at 15, Moorgate, London, E.C.

The following is the statement of the Chairman, Major Julian Day, M.C., which has been circulated with the report and accounts for the year ended May 31, 1942:

Since our last meeting the Directors have lost two highly esteemed colleagues. Mr. S. G. Wood, Deputy Chairman of this Company and of Severn Valley Gas Corporation, Ltd., died on April 2. From the very early days of the Company he played an important part in every phase of its activities, and was well known to the staff and employees of all the Company's subsidiaries throughout the organization. He will be greatly missed. Mr. Hugh C. Bischoff died on May 29 last. He also joined the Board of the Company not long after its formation. He had not had previous association with the Gas Industry, but the Board benefited greatly by his wise counsel and his wide experience in other fields, and his loss will be felt acutely.

In the accounts which have been circulated the balance-sheet shows very few changes. We are lending to our subsidiary companies approximately £10,000 more than a year ago. Revenue account shows a reduction in gross revenue of nearly £2,000. Dividends on investments (gross) are £2,600 less, and there are small increases in other sources of revenue. On the debit side of the account the amount required for income-tax shows an increase of just over £2,000. Other items show very little change, but there is a new item—"Reserve against losses of subsidiary companies £525." This item is referred to also in the balance-sheet under the heading: "Statement pursuant to Section 126 of the Companies Act, 1929." Losses have been incurred by three of the company's smallest subsidiaries, and to the extent that such losses have not been provided for in the accounts of those companies, this provision is made in the accounts of the parent Company.

It is in these small units of production that fluctuations in the cost of materials and labour are most difficult to assimilate. Our experience convinces us that gradually the number of units of production must be decreased and the smaller works be closed down when supplies in bulk can be provided, but this cannot be put into effect widely under war conditions. For the moment we can only plan for a post-war programme in this respect. These small losses are not occasioned by decreases in the consumption of gas, for throughout the group there has been a notable increase in the amount of gas supplied to consumers, but as I have said, to increases in cost of production. In the aggregate, profits of the subsidiary companies available for distribution exceed the amount which has been paid in dividends to the parent company.

As a result of the decrease of £2,000 in gross revenue and of the increase of approximately £2,400 in the items on the debit side of revenue account, the amount carried to appropriation account is £17,571, being about £4,300 less than last year. To this is added the balance of £11,624 brought forward from last year after providing for the final dividends, making, as shown in the Directors' report, a total amount available of £29,195, from which have been deducted the Preference dividends for the year and the interim dividends on the "A" and "B" Ordinary stock paid last December amounting to £11,211, leaving a balance available for distribution of £17,984.

The final dividends recommended are at the same rate as last year, making the year's dividend on both "A" and "B" Ordinary stock 5% per annum less tax. After giving effect to these the amount to be carried forward is £11,245.

### Demands Successfully Met

By the Direction of the Board of Trade I am prevented from making any reference in detail to the operations of the subsidiary companies, In general, as the accounts indicate, the year has been one of stability. and I may add that the companies have successfully met the demands made upon them to further the war effort. Mr. G. Stevenson, who has for so long and successfully been in charge of the operations of the Long Eaton Gas Company as Managing Director, has joined the boards of a number of the subsidiary companies, thus extending to them the benefit of his considerable experience.

Our thanks are due to the managers, staff, and employees of the subsidiary companies of the group as well as to our Managing Director and his central organization for the manner in which they have carried out the work of the undertakings throughout the past year. The problems raised by the necessary restriction in fuel consumption and the difficulty in securing sufficient experienced labour will undoubtedly add to the strain on the operating staffs throughout the group. There is, however, a splendid spirit of loyal co-operation which I am confident will help us to overcome the difficulties which lie ahead.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

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# Gas Products Prices

### The London Market July 27.

The only change in the prices of Coal Tar Products in the London Market refers to 95/160 Solvent Naphtha, which is now about 2s. 3d. to 2s. 7d. per gallon.

### The Provinces July 27.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 1s. to 1s. 4d. according to quality. Solvent naphtha, naked, North, 2s. 2d. to 2s. 6d. Heavy naphtha, North, 1s. 10d. to 1s. 11d. Carbolic acid, 60's, controlled by the Coal Tar Acids Prices (Inland) Order, 1942, operative from May 1. Naphthalene, controlled by the Naphthalene prices (Inland) Order, 1942, dated April 15, 1942, and operative from May 1, 1942, £19 to £19 10s.—bags free. Anthracene, controlled by the Anthracene Prices (Inland) Order, 1942, operative from May 1. Filtered heavy oil (min. gr. 1,080), 7¼d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5¼d; timber preservation and other purposes 4¾d. to 6d. These prices apply as from May 13.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

### Tar Products in Scotland July 25.

Deliveries are proceeding at a steady pace. Refined tar controlled. Value about 4½d. per gallon *ex* Works naked. Creosote oil: Specification oil, 6¾d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6¾d. to 7d. per gallon; all *ex* Works in bulk. Cresylic acid is directed to certain channels with refined acids controlled at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha, 6½d. to 7d. Solvent naphtha, 90/160 grade, 2s. to 2s. 3d., and 90/190 Heavy Naphtha, 1s. 9d. to 2s. per gallon. Pyridine, 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

# Gas Stocks and Shares

Stock markets on the whole were quiet last week although the general undertone remained firm. There was a little more activity in the Gas Market, however, and it will be seen that under the lead of Gas Light units, which closed 6d. higher at 13s. 6d., a few ordinaries improved a point or two. It is interesting to note the fractional improvement in Cape Town preference since the price of the transaction was recorded at 14s. 6d. against 7s. 6d. in February last. There was a good demand for Imperial Continental ordinary which was also marked up. More transactions than usual were recorded in the Supplementary List, and except for the two changes shown prices remained unchanged.

The following price changes took place during the week:

**OFFICIAL LIST**

| | | |
|---|---|---|
| Cape Town 4½ p.c. Pref. ... ... ... | ½—1 | +½ |
| Gas Light Units ... ... ... | 13/—14/- | +-/6d. |
| Ditto 3½ p.c. max. ... ... ... | 50—55 | +2 |
| Ditto 3 p.c. Deb. ... ... ... | 80—88 | —1 |
| Imperial Continental Ord. ... ... | 62—67 | +1 |
| Portsmouth Cons. ... ... ... | 92—97 | +2 |
| South Metropolitan Ord. ... ... | 57—62 | +1 |
| Ditto 4 p.c. Pref. ... ... ... | 62—67 | +2 |

**SUPPLEMENTARY LIST**

| | | |
|---|---|---|
| Croydon 4 p.c. Deb. ... ... ... | 95—100 | +5 |
| Tottenham 5 p.c. Red. Mortgages... | 99—102 | —3 |

**PROVINCIAL EXCHANGES**

| | | |
|---|---|---|
| Bristol Ord. (x.d.) ... ... ... | 108—110 | July 13 |
| Liverpool 4 p.c. Deb. (x.d.) ... ... | 98—100 | July 15 |

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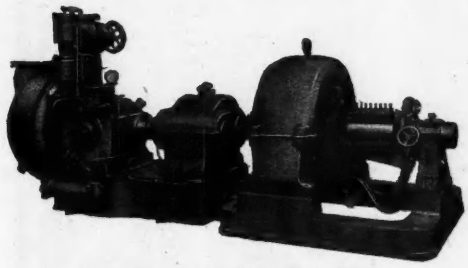

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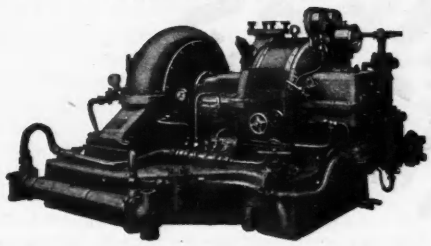

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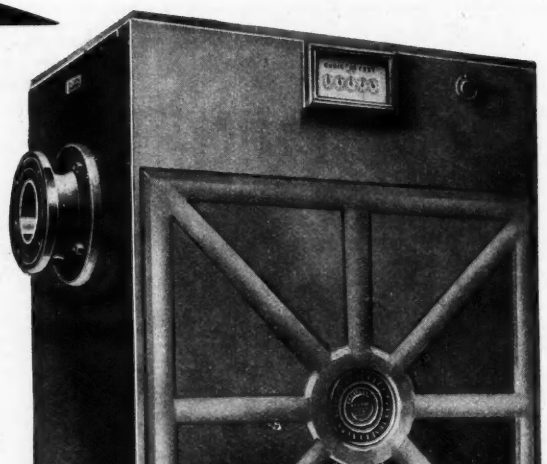

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